

*Southwestern
Pennsylvania
Ozone Stakeholder
Working Group*



Final Report

January 16, 1997

Convener: Commonwealth of Pennsylvania

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Southwestern Pennsylvania
Ozone Stakeholder
Final Report

Table of Contents

Commonwealth convenes ozone stakeholders	1
Final report transmittal memo with signatories	2
Final Report	4
Appendix A: Minority Reports	16
Appendix B: Operating Agreements	22
Appendix C: List of Strategies Considered	31

Related environmental information is available electronically via Internet. Access the DEP-DCNR Web Site at <http://www.dep.state.pa.us> (choose Information by Environmental Subject/choose Air Management).

March 12, 1996

See Attached List

Dear _____:

We are pleased to invite you to participate in the Southwest Pennsylvania Clean Air Stakeholders Group. The Stakeholders Group will work during the next year to develop a course of action for the attainment and maintenance of the health-based ozone standard, a strategy tailored to meet the regional needs of the Pittsburgh area.

We believe that new clean air strategies in areas with continuing air pollution problems should be developed from the ground up, by those with significant stakes in the outcome. The Commonwealth needs a plan that is based on good air pollution science, is equitable among air pollution sources and meets the requirements of the federal Clean Air Act Amendments. The Clean Air Stakeholders Group has been charged with this important mission. We expect the outcome of this effort to be recommendations that the Commonwealth can use as the basis for continuing to meet its clean air obligations. The group will operate by a consensus decision-making process. Areas on which there is no consensus will also be identified.

Since the sources contributing to ozone pollution and the people affected by it are diverse, the stakeholders group has to be large enough to represent these interests, yet small enough to form a group that can work together. You have been selected because of your ability to provide appropriate representation, as well as your personal qualifications and capacity to work toward consensus on a broad range of clean air issues.

The first meeting has been scheduled for March 25 and 26, 1996. Most of the time at this convening meeting will be spent on developing principles of operation for the group, identifying agenda items, and participating in a brief training session on interest-based negotiation and consensus building. The group will also develop its own meeting schedule. You will be getting a packet of materials for the first meeting in the next few days. The Commonwealth will reimburse you for your travel expenses through a procedure which will be explained at the first meeting. As you already know, the Commonwealth has engaged an independent facilitator from CDR Associates to help us achieve a common understanding of the problem and arrive at potential solutions.

Consensus is not an easy process. It takes communication, compromise, common sense and most of all, commitment. We appreciate your willingness to work with us, and we look forward to working with you in the coming months. Should you have questions in the meantime, please feel free to contact Robert Barkanic, Special Assistant; Air, Recycling and Radiation Protection, DEP, at 717-772-2725.

Sincerely,



James M. Seif
Secretary
Department of Environmental Protection

Sincerely,



Bradley L. Mallory
Secretary
Department of Transportation

MEMORANDUM

DATE: December 18, 1996

TO: The Honorable James M. Seif, Secretary, Pennsylvania Department of Environmental Protection
The Honorable Bradley L. Mallory, Secretary, Pennsylvania Department of Transportation

RE: Southwestern Pennsylvania Ozone Stakeholder Working Group's Final Recommendations

=====

We, the representatives of the Southwestern Pennsylvania Ozone Stakeholder Working Group (Working Group), submit these recommendations for your consideration.

We have been working since March 1996, to achieve the following purpose:

"To recommend strategies for ozone attainment and maintenance based on the current health-based standards and the requirements of the Clean Air Acts."

We participated in a nine-month interest-based negotiation process using consensus decision making. Our initial meeting was organizational, clarifying the purpose and establishing the procedures for the negotiation. During the next several months we educated ourselves about the ozone problem as well as the range of interests represented at the table. An important step in understanding the nature of the problem was developing a photochemical modeling process to characterize the ozone problem in the region. During the final several months we focused on exploring a variety of control options and developing recommendations which best address our diverse interests.

We also conducted a series of public outreach events in each of the seven counties of the nonattainment area in order to educate the public regarding our process and the substance of the deliberations, as well as to solicit the public's input to help inform the negotiations.

Our group identified a number of key interests which are addressed by the attached recommendations. These interests can be summarized by the following principles: to clean the air; to preserve the health of citizens; to be environmentally effective and sound; to minimize negative economic impacts; to be balanced and equitable; to creatively use incentives; to be practical, implementable, flexible, timely; to be acceptable to the general public and legislature; to focus on long-term strategies and effectiveness.

In addition to the attached recommendations, the Working Group recommends that the Department of Environmental Protection (DEP) continue to develop analyses to support a maintenance plan as part of its attainment demonstration.

Thank you for the opportunity to participate in this process. Collectively, the stakeholders stand ready to meet with you to discuss these proposals.

Sincerely,

The Southwestern Pennsylvania Ozone Working Group

Peggy Burrell
(Hudd)
James M. Hart
James Dr. Salvaggio
Joseph L. Seinfeld
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Paul M. King
Peter K. Fure
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Audrey Miser
Monica L. Spink
Rory Brandenberg
Sue Seppi
Roger C. Westman
Robert O. Johns

SOUTHWESTERN PENNSYLVANIA OZONE WORKING GROUP FINAL RECOMMENDATIONS

Working Group Mission

The Governor of Pennsylvania, through the Pennsylvania Department of Environmental Protection (DEP) and the Pennsylvania Department of Transportation (PennDOT), created the Southwestern Pennsylvania Ozone Working Group to recommend strategies for ground-level ozone attainment and maintenance based on the current health-based standards and the requirements of the Clean Air Act.

Working Group Process

The Working Group has met monthly since March 1996. The first several months were devoted to getting organized as a group and becoming informed about the ozone problem in southwestern Pennsylvania. The attached Operating Agreements for Stakeholder Deliberations outline the basic assumptions under which the group agreed to conduct its negotiations.

Decision Making

The recommended strategies outlined in this report are based on a consensus decision-making process as outlined in the Working Group's Operating Agreements. Consensus is an agreement built by identifying and exploring all parties' interests and by assembling a package agreement which satisfies these interests to the greatest extent possible. Where the full group was not able to reach consensus, there are minority reports.

Background

The Working Group identified major areas in which more information was needed about the ozone problem in southwestern Pennsylvania before substantive discussions could begin. Ozone is formed during hot summer days by complex chemical reactions resulting from emissions of volatile organic compounds (VOC) and nitrogen oxides (NO_x) in the presence of sunlight. Major topics included: chemistry of ozone formation, health effects of ozone, theories and use of photochemical modeling to understand the nature of the ozone problem in the area as well as the impact of potential control options, emission inventory for Southwestern Pennsylvania (in order to understand the relative VOC and NO_x contributions of source categories) and the range of potential control options.

Modeling

The Working Group commissioned Alpine Geophysics to conduct photochemical modeling of the ozone problem in southwestern Pennsylvania. Following Environmental Protection Agency (EPA) regulatory guidance, the Working Group decided to use the UAM-IV airshed model. The meteorological model, MM5, was used to derive the meteorological fields (e.g., temperatures, wind fields). Transport of pollutants and precursor emissions from areas outside of the model domain are described in the boundary conditions. The boundary conditions were derived from the regional-scale runs of the UAM-V which were conducted by the Ozone Transport Assessment Group (OTAG).

Emissions estimates within the nonattainment area and Pennsylvania were provided by the regulatory agencies (DEP, Allegheny County Health Department [ACHD]). Emissions estimates outside of Pennsylvania were primarily derived from OTAG data and were refined with data provided by the stakeholders. Biogenic emissions were estimated with the EPA regulatory approved model BEIS because it is compatible with UAM-IV. Of note, BEIS2 was run to determine the sensitivity of the model results to the biogenic emissions estimates because of information indicating that BEIS possibly underestimated biogenic emissions. On-road mobile source emissions were derived through the use of the EPA regulatory approved MOBILE5a_H model.

The group chose three high ozone episodes (a series of days conducive to ozone formation) to model. The episodes were chosen based on EPA guidance. Episode 1 covers the time period 30 July 1995 through 2 August 1995. Episode 2 covers the time period 12-15 July 1995. Episode 3 covers the time period 16-19 June 1995.

The group conducted numerous sensitivity runs to elicit the impacts of many control strategy alternatives. The sensitivity runs included: alternate boundary conditions, eliminating or reducing all emissions from the seven-county nonattainment area, etc. Sensitivity runs were intended to model ozone formation under a variety of conditions such as reduced temperatures or the adoption of new control measures in the nonattainment area and/or upwind areas. Results of these sensitivity runs indicated that the Working Group needed to consider both NO_x and VOC controls in the nonattainment area as well as reductions from upwind sources in order to meet national ambient air quality standards as set by EPA.

The modeling system (MM5, UAM-IV, and EMS-95) accounts for the physical and chemical processes that occur in the atmosphere. The models mathematically describe such processes as transport and chemical transformation of pollutants. A modeling system's ability to describe accurately observed air quality parameters is elicited through a model performance evaluation. A model's ability to predict observed air quality is affected by the quality of the model inputs. The modeling system has been validated for use in determining control strategy impacts. In summary, the emissions control strategies

that have been proposed by the stakeholders should result in improved air quality. That is, the magnitude and geographic extent of future peak ozone concentrations should be reduced through the implementation of the proposed stakeholders' emissions control strategies to be used by DEP to prepare an attainment demonstration for submittal to EPA.

Alpine Geophysics will deliver a compendium of its results to DEP, which will make it available on request to interested parties.

Control Options

While sensitivity modeling was conducted, the Working Group identified 133 potential control options. These options were considered in light of the Working Group's identified interests (see attached interest list). The original list of options was pared down to those options considered most likely to meet the Working Group's range of interests. These options were then investigated in greater detail, and evaluated in terms of cost effectiveness, emissions reductions, political acceptability, environmental impact, etc.

Three-Tier Approach

Due to the complexity and uncertainty of ozone modeling and the multi-faceted nature of the ozone problem, a specific prescription for southwestern Pennsylvania's ozone problem was not possible. Therefore, taking the model results and other information into account, the Working Group developed a three-tier approach to use when addressing the ozone problem in southwestern Pennsylvania. The three-tier approach recognizes the limitations of photochemical modeling, the potential role of transport and the local ozone producing emissions generated in southwestern Pennsylvania when selecting control options.

The components are as follows:

- Tier I:* Develop reasonable and appropriate recommendations to reduce the ozone precursors emitted in the seven-county nonattainment area.
- Tier II:* Develop an analysis to determine if reductions may be needed from upwind sources to achieve attainment in the seven-county nonattainment region.
- Tier III:* Develop supplemental technical analyses as provided for in the modeling guidance which demonstrate that within the uncertainties and limitations of the model, the Working Group's recommendations reduce the magnitude, frequency and geographic extent of the ozone problem sufficiently to enable DEP to prepare an attainment demonstration for submission to EPA.

This report is divided into three sections based on the above tiers.

TIER I: DEVELOP REASONABLE AND APPROPRIATE RECOMMENDATIONS TO REDUCE THE OZONE PRECURSORS EMITTED IN THE SEVEN-COUNTY NONATTAINMENT AREA.

Based on results of sensitivity runs, the Working Group concluded that some of the ozone in Southwestern Pennsylvania is caused by man-made NO_x and VOC emissions which can be controlled through regulatory, voluntary and incentive-based strategies within the seven-county nonattainment area. The Working Group has used its best judgement, based on available data, group interests and the experience of other moderate nonattainment areas to create this package of control options.

The recommendations are divided into four sub-categories: immediate recommendations, near term recommendations, episodic recommendations and additional recommendations. Immediate control options should be implemented within the next year. Near term control options require more regulatory ground work which will extend the time for implementation. Episodic measures are those which target times of predicted high ozone levels and are currently not eligible for State Implementation Plan (SIP) credit. Additional measures include options which seem to hold value for future emission reduction, but which require ongoing investigation and deliberation to define in implementable terms. The Working Group charges the Commonwealth with continuing such deliberations.

Unless otherwise indicated, the recommendations target the seven-county moderate nonattainment area as designated in the 1990 Federal Clean Air Act Amendments. The seven counties are Allegheny, Armstrong, Beaver, Butler, Fayette, Washington and Westmoreland.

ANTICIPATED FEDERAL MEASURES

The Working Group anticipates the implementation of the federal measures listed below to reduce VOC and/or NO_x from the following source categories, as called for in the Clean Air Act, by the year 1999.

- Architectural Coating
- Automobile Refinishing
- Commercial/Consumer Products—all classes
- Federal Motor Vehicle Program (Tier 1 Tailpipe Standards)
- Heavy Duty Diesel Engines
- Industrial Maintenance Coatings
- Recreational Marine Engines
- Small Gasoline Engines
- Traffic Markings
- Treatment, Storage and Disposal Facilities

IMMEDIATE RECOMMENDATIONS

55% Reductions in NOx from Utility, Independent Power Producer (IPP) and Other Large Industrial Boilers

As part of the "considerations and current assumptions" as outlined in the Operating Agreements for Stakeholder Deliberations, the Working Group recognizes that the Phase II of the Northeast Ozone Transport Commission's "Memorandum of Understanding" (NOx MOU) would be adopted by the Commonwealth of Pennsylvania as a NOx reduction strategy. Therefore, even though the Pennsylvania regulations implementing the NOx reduction specified in the NOx MOU have not yet been finalized, the 55% reduction in NOx from utility, IPP and other large industrial boilers (that are subject to Phase II of the NOx MOU) has been understood to be one of the precursor reduction options in the Western Pennsylvania attainment strategy modeled for the seven-county nonattainment area.

Decentralized Enhanced Inspection and Maintenance Program

The Working Group recommends the following as related to a decentralized enhanced inspection and maintenance program. As part of the "consideration and current assumptions" for deliberations as outlined in the Operating Agreements For Stakeholder Deliberations, the Working Group recognized that a four-county decentralized enhanced inspection and maintenance program would be implemented. The Working Group supports the decentralized enhanced inspection and maintenance program for Allegheny, Beaver, Washington and Westmoreland counties. The Working Group recommends the further enhancements to the program: gas cap checks, an anti-tampering program and a technician training component.

Stage II Vapor Recovery Systems for Gasoline Stations

The Working Group recommends the following as related to Stage II Vapor Recovery in the seven-county nonattainment area.

- Stage II should be put in place by all stations pumping an average of 120,000 gallons of gasoline per month based upon 1995/1996 sales by the end of the year 1998.
- Stage II should be put in place by all stations pumping an average of 90,000 gallons of gasoline per month based upon 1995/1996 sales by the end of the year 2000.
- As of April 1, 1997, Stage II will be required to be installed and operationed by all newly constructed gasoline dispensing facilities.
- As of April 1, 1997, Stage II is required to be installed and operationed at the re-opening of any gasoline dispensing facility which has been rebuilt or renovated where tanks and associated piping have been substantially disturbed in the rebuilding or

renovation process.

- Stage II will no longer be required as of the year 2010 provided the on-board canister program is implemented.

The Working Group also encourages enhanced enforcement of Stage I Vapor Recovery.

This recommendation is contingent upon all safety-related questions surrounding Stage II and on-board vapor recovery devices being addressed satisfactorily.

Cleaner Gasolines

The Working Group recommends a cleaner gasoline for the seven-county nonattainment area.

The Working Group, minus one member, recommends that all gasoline sold for dispensing in the seven-county nonattainment area during the ozone season will be either reformulated gasoline (RFG) or 7.8 Reid vapor pressure (RVP) gasoline with individual refiners or distributors selecting which fuel they wish to market.

Storage tanks may include both fuels. The DEP will develop a fuel testing program to differentiate between conventional, 7.8 RVP and RFG gasolines. This testing will be implemented at the retail, distributor and refinery levels in the seven-county nonattainment area. The Working Group recognizes that OTAG may develop a fuel recommendation for the region.

Certain Stakeholders pointed out that the Federal RFG program provides additional environmental benefits by being a "year round" program and by reducing air toxics. Certain others were opposed to using a year-round strategy because the Working Group was dealing with a ground level ozone problem and their charge was to develop a strategy that was cost effective and that people will accept. They felt that a year-round strategy met neither of these criteria.

(See minority report from member who does not support the recommendation specified in the three paragraphs above.)

(See minority reports from other members regarding their perspectives on fuels options as contingency measures.)

NEAR-TERM RECOMMENDATIONS

The Working Group recommends that the following emission reduction measures be implemented to provide a margin for growth and to provide increased assurance the standard will be attained and maintained.

Degreasing Controls

The Working Group encourages the use of citric-based and water-based solvents for commercial and industrial sources using VOC-containing solvents during the production, repair, maintenance or servicing of parts, products, tools, machinery, equipment or general work areas.

Open Burning Ban

The Working Group recommends that open burning be prohibited at commercial and industrial facilities in the seven-county area (12 months per year), as it is currently in Allegheny County and other air basins.

Point of Sale Proposal for Automobile Refinishing

Unless significant evidence to the contrary emerges, the Commonwealth should limit on a state-wide basis the sale of paint containing VOC to auto and truck body repair shops to those that have High Volume Low Pressure or equivalent equipment, appropriate gun cleaning apparatus to control VOC emissions and training for employees handling and using these paints. The Working Group further recommends the Commonwealth should consider exemptions for hobbyists and small volume users. The Working Group charges DEP and interested parties to explore effectiveness, to work out the design of the program and the administration and enforcement of this option within the parameters of the Working Group's recommendation.

Smoking Vehicle Program

The Working Group recommends that DEP pilot a smoking vehicle program to evaluate its effectiveness. This program should give the public the opportunity to report vehicles with visible emissions. Components of the program include: an aggressive initial advertising campaign (using free advertisements where possible); an automated 24-hour phone line, fax line, and an Internet address, through which people report the make and model of the smoking vehicle, the license plate number, and the time and location the smoking vehicle was observed; letter and surveys sent out to the owners of reported vehicles encouraging them to make the necessary repairs. Also DEP and PennDOT should coordinate the Smoking Vehicle and the Remote Sensing portion of the I/M programs.

Key interested parties should be included in DEP's evaluation of the program's effectiveness (such as the Ozone Action Partnership).

Public Transit Alternative Fuel Vehicle Program

The Working Group encourages the Port Authority (PAT) to work with DEP, PennDOT and the Southwestern Pennsylvania Regional Planning Commission (SPRPC) to achieve 9.5% reductions in total diesel-sourced highway vehicle NOx emissions by replacing diesel powered transit vehicles with natural gas powered vehicles in the nonattainment area.

The Working Group encourages above groups to explore funding alternatives for purchase of Alternative Fuel Vehicles (AFV) and refueling facilities.

Pennsylvania Alternative Fuel Program, Private Fleets

The Working Group encourages DEP and PennDOT to promote the use of current state incentives and current and future federal incentives and explore ways to remove the disincentives which now exist for fleets to convert to alternative fuel vehicles (including electric vehicles). Certain stakeholders stressed the importance of maintaining a level playing field for fuels.

Transportation Control Measures

Transportation Control Measures (TCMs) are an important part of strategies to reduce emissions from mobile sources. Pennsylvania is presently experiencing a transportation funding crisis. In developing the region's current Transportation Improvement Plan (TIP), SPRPC was faced with a reduction of 30% in projected funding available from state, federal and local sources. As a result, the program includes relatively few projects that could be considered TCMs.

Any TCMs that are recommended for the SIP must be included in the region's TIP and must be funded from available existing funds, and in effect replace currently programmed projects. Any program change must be approved by SPRPC's Board and the Commonwealth.

The Working Group encourages SPRPC to consider more extensive TCMs and Transportation Demand Management (TDMs) in their future planning and programming. We also encourage the state legislature to support additional transportation funding so that additional TCMs can be considered for programming. The Working Group supports the following modestly priced TCMs.

Regional Traffic Signal Improvement Program

Improve and coordinate five percent of the region's approximately 800 traffic signals located on the highest volume radial corridors at a cost of approximately \$5 million. This improvement must be consistent with the approved TIP and within existing funding.

Develop related signal improvement strategies and policies that can be applied to the region's remaining traffic signals. Also, the Working Group asks that SPRPC and PennDOT work with local municipalities to encourage them to improve their existing signals through timing and other low cost and no cost efforts.

Transit Shuttle Service and Coordinated Transit Service

The Working Group encourages SPRPC, working through its members, to promote institution of transit shuttle service by the region's transit operators, particularly the PAT of Allegheny County, in areas with lower trip densities using service concepts pioneered by PAT in its 1991 demonstration project in the Monroeville area (the Link). SPRPC is also encouraged to promote development by the region's transit operators of a coordinated fare structure and fare policies, coordinated transit schedules and service to common points and a plan to jointly market their coordinated schedules and fares.

Ride Sharing Incentives

The Working Group encourages SPRPC and the region's transportation agencies to continue developing, promoting and expanding use of cost-effective transit and ridesharing incentives such as: guaranteed ride home programs, parking pricing strategies and priority parking policies for carpools and vanpools and targeted subsidies for carpools, vanpools and transit services.

Bicycle/Pedestrian Facilities

The Working Group encourages SPRPC, PennDOT and other local officials to give higher funding priority on the region's TIP to projects that develop and implement facilities and incentives for travel by bicycle and walking in order to reduce the number of short automobile trips (less than 3 miles in length) and their resultant "cold start" emissions. To the extent possible, new bicycle and pedestrian projects should complete and promote use of already programmed facilities like the \$8.3 million bikeway and trail improvements included in the current TIP.

Intermodal Goods/Commodity Movement

The Working Group supports public policies that would promote the shipment of freight to, through, and within the region in a more fuel-efficient manner (such as through greater use of river barges and rail) in order to reduce the amount of air pollution produced by goods movement activity.

Incident Management

The Working Group encourages SPRPC and PennDOT to identify and continue to explore opportunities for reducing the level and duration of congestion and resultant

vehicular emissions caused by "incidents" (highway accidents, vehicle breakdowns) through deployment of an Intelligent Transportation System strategy on the region's transportation infrastructure.

EPISODIC MEASURES

Episodic High Ozone Days Voluntary/Mandatory Measures

The group strongly supports the Ozone Action Partnership's work promoting episodic measures for ozone management. The Working Group encourages further exploration of the feasibility of cost effective mandatory measures and creative use of incentives, and recommends that EPA reevaluate current guidance to allow SIP credit for episodic measures when demonstrated to be effective and enforceable. The group also urges DEP and Allegheny County to work closely with its air permittees and other employers to encourage participation in the Partnership.

ADDITIONAL RECOMMENDATIONS

Plan for Continuing Ozone Reduction Education and Research

The Working Group recommends that DEP expand its education and research efforts to include (a) conducting research on the causes of ozone and innovative methods for reducing ozone (including episodic, year-round and seasonal reductions in precursor emissions), and (b) coordinating the efforts of other interested agencies and organizations (such as the Ozone Action Partnership, Allegheny County Health Department's Air Pollution Control Advisory Committee's Education Subcommittee, local universities, etc.) to promote an ongoing year-round dialogue in the community regarding ozone, its impacts on health and methods of reducing it.

Emission Reduction Credits for Small Point Sources

Ensure that the 1996 point source emission inventory used in modeling analyses includes all Emission Reduction Credit applications currently approved by or pending before the ACHD or DEP. Ensure that plants shut down between 1990 and 1995 are consistently and appropriately included in the 1996 inventory. It is important to understand that emissions inventories are routinely updated and corrections made as additional data and improved emissions factors become available.

TIER II: *DEVELOP ANALYSES TO DETERMINE IF REDUCTIONS MAY BE NEEDED FROM UPWIND SOURCES TO ACHIEVE ATTAINMENT IN THE SEVEN-COUNTY NONATTAINMENT AREA.*

The information available to the Working Group indicates that a substantial portion of the ozone in southwestern Pennsylvania is caused by ozone and its precursors from upwind sources, and that these upwind emissions can cause or contribute to exceedances on some days. The stakeholders did not have resources sufficient to establish the relative contributions of specific upwind sources or the appropriateness of specific additional controls on upwind sources, but it recognized that OTAG and others are examining this issue in greater depth. While the Working Group recognizes that the Commonwealth has other options, the Working Group endorses the OTAG process and eagerly anticipates its recommendations to address transport issues. The Working Group hopes that OTAG's recommendations will result in actions by the states and upwind sources, either voluntarily or through "SIP calls" by EPA, that will adequately meet the health, economic and other interests of Pennsylvania. In the event that upwind sources, upwind states or EPA do not implement measures to adequately address transport issues within a reasonable period of time via the OTAG process, the Working Group recommends that the Commonwealth explore its other options to effectively address the transport problem. The Working Group also urges that EPA evaluate the impact of transport from upwind areas when considering what measures are appropriate when exceedances occur in southwestern Pennsylvania.

TIER III: *DEVELOP SUPPLEMENTAL TECHNICAL ANALYSES AS PROVIDED FOR IN THE MODELING GUIDANCE WHICH DEMONSTRATE THAT WITHIN THE UNCERTAINTIES AND LIMITATIONS OF THE MODEL, THE WORKING GROUP'S RECOMMENDATIONS REDUCE THE MAGNITUDE, FREQUENCY AND GEOGRAPHIC EXTENT OF THE OZONE PROBLEM SUFFICIENTLY TO ENABLE THE DEP TO PREPARE AN ATTAINMENT DEMONSTRATION FOR SUBMISSION TO EPA.*

The UAM-IV model has been approved by EPA for use. However, the model is not perfect. It is very useful to demonstrate that the emission reduction strategies move us in the right direction toward ozone attainment.

The modeled peak ozone values may not precisely reflect the peak ozone values in the Pittsburgh nonattainment area because the model evaluation demonstrated bias in estimating peak values. Also, the model showed exceedances in areas where no monitors exist, so there are differences between the peak values shown in the model and those reported in 1995 monitoring data. In addition, the model shows much lower ozone values in surrounding grid's cells. This indicates some potential problems are yet to be understood.

- We recommend the nine cell averaging and other technical considerations be used in a weight of evidence argument to accompany the modeling done to demonstrate attainment.
- In addition, the Working Group supports additional analyses by DEP in preparing the SIP in order to address the magnitude, frequency and geographic extent of the model's predicted ozone concentration.
- The Working Group notes that the summer of 1995 was the second hottest summer in the past 30 years. During the summer of 1995, there were nine days on which the health-based ozone standard was exceeded.

Appendix A

Minority Reports



Investment Building 239 4th Avenue Suite 1808 Pittsburgh, PA 15222
412/471.1770 FAX 412/471.1661

Davitt B. Woodwell, Esq.
Director
Western Pennsylvania Office

**Pennsylvania Environmental Council
Minority Report on Contingency Measures
Southwest PA Ozone Stakeholders Working Group
December 20, 1996**

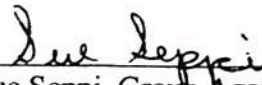
It is recognized that the Department of Environmental Protection will develop a contingency plan as a part of its attainment demonstration. In general, the group did not discuss contingency measures as they apply to any category of ozone precursor sources. Some consideration was given to a possible "fallback" on fuel options. However, no decisions were ever finalized. Several possible contingencies were discussed for fuel options. Certain members strongly supported RFG (at whatever level is in place federally at the time) as a priority measure. Certain stakeholders also supported alternative fuels. Certain others felt that it was important to explore the use of even lower (7.0 psi) fuels as well. Certain others felt that we should not make any recommendations on contingencies. As DEP develops its contingency plan for the region, it should revisit all issues surrounding fuel options.

Davitt B. Woodwell, Esq.
Director, Western Pennsylvania Office

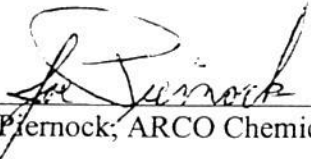
MINORITY REPORT ON THE GASOLINE OPTION


At the end of the original debate on Reformulated Gasoline (RFG) vs Low Reid Vapor Pressure Gasolines (Low-RVP), it was understood by the majority of stakeholders that RFG would be considered the primary fuel contingency.

The undersigned believe that RFG will provide an added measure of VOC reductions that will be needed for our region.


Sue Seppi, Group Against Smog and Pollution


Marilyn Solnick, Sierra Club, Allegheny Group


Joe Pernock, ARCO Chemical Company


Fred Harchelrode, Allegheny General Hospital

December 19, 1996

To: Mary Davis Hamlin

From: Jim Kantzes

Re: Minority Report on Fuels Options as Contingency Measures from API Stakeholder

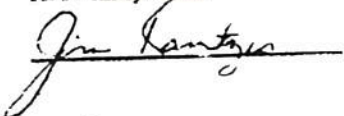
API supports the Stakeholder recommendation for a market-driven fuel choice as presented in the report under Cleaner Gasoline.

During the course of the Stakeholder deliberations, some consideration was given to establishing a "fallback" fuel option, should the agreed-upon VOC and NOx strategies fail to help the area achieve and maintain the current ozone standard. API was unwilling to support such a "fallback" option for the following reasons:

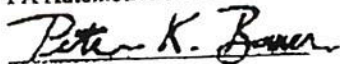
1. In the event of continued exceedances of the ozone standard, it should first be determined whether the triggering pollutant is VOCs, NOx or both precursors. An assumption that more stringent controls on VOCs would solve the problem is not based in fact.
2. If additional emission controls are needed, they should be chosen based on cost-effectiveness. An assessment similar to that which was performed by the Stakeholders for this round of reductions would be appropriate.
3. A definitive mechanism for instituting the "fallback" option was never provided. It was unclear whether the intent of the proposer was that a new fuel would be used after one exceedance, one violation, a change in the standards, or upon an indication from EPA that the area needed additional controls.

As evidenced by our participation in the Stakeholders process, API will support emissions reduction measures which are necessary and cost-effective. The proposal for a "fallback" fuel option met neither of these standards.

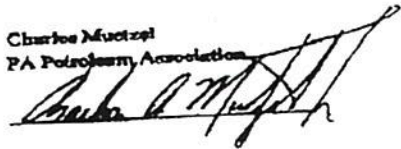
Jim Kantzes
API Pennsylvania



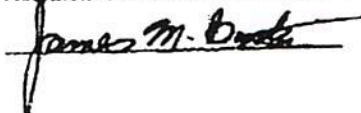
Peter Deuer
PA Automotive Association



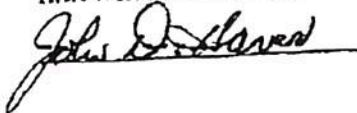
Charles Muetzel
PA Petroleum Association



Jim Battino
Automotive Service Assoc. Center of PA



John D. Haver
AAA West Penn/West Virginia

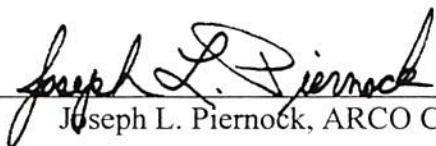


Minority Report and Dissenting Opinion on the Gasoline Option

RFG as a Primary Measure - I recognize that a fuel option is vital to reaching attainment in the seven county non-attainment area of Southwestern Pennsylvania. I continue to recommend Federal Reformulated Gasoline ("RFG") as the primary option based upon its proven, cost-effective performance both in theory and in practice. My constituency and I strongly believe that merely reducing the Reid Vapor Pressure of conventional gasoline to 7.8 psi ("7.8-RVP") does not provide the same benefits as the full reformulation provided by RFG. In addition, while it may cost a refiner less to make 7.8-RVP than RFG, these savings have not been shown to result in lower prices to the consumer, just more profit for oil companies. Therefore, I request that RFG still be considered as the primary fuel option for Southwestern Pennsylvania if the State subsequently discovers that (a) Federal RFG is more effective at controlling ozone than 7.8-RVP or that (b) RFG's collateral benefits are worthwhile.

RFG as a Backup Plan - The Market-Based fuel option is a de facto mandate for 7.8-RVP gasoline. However, in the interest of approving some fuel improvements, I was willing to accede to the Market-Based proposal as a test for 7.8-RVP as long as it stipulated that RFG would be the "safety net" if the region still experienced exceedances with 7.8-RVP. At the end of the original debate on fuel options, I believe that a strong majority of Stakeholders agreed with this strategy and felt that the fuel proposal should incorporate a backup plan that only included RFG. Unfortunately, this safety net was subsequently dropped.

I am concerned that conventional gasolines with RVP's below 7.8 ("Low-RVP") may be considered as backups to 7.8-RVP. Recent information based upon real-world air quality measurements, real-world gasoline quality data, and theoretical studies indicate that Low-RVP gasolines should not be used in any emission reduction strategies. These studies lead to the expert opinions of automakers, health organizations, environmental authorities and some refiners that are enclosed as a separate attachment. The weight of evidence was so overwhelming that the Governor of Arizona recently announced that Phoenix will replace its Low-RVP gasoline program with Federal RFG since the Low-RVP program was such a failure. Therefore, I continue to urge the State to adopt RFG as a safety net for the Market-Based fuel option.



Joseph L. Piernock, ARCO Chemical Company

MINORITY REPORT
USE OF ALTERNATIVE FUELS AS CONTINGENCY MEASURES
Southwestern Pennsylvania Ozone Stakeholders Group

Harold D. Miller
Director
Southwestern Pennsylvania Growth Alliance

December 20, 1996

The Stakeholders Group did not have sufficient time or information to discuss what, if any, additional control options should be included as "contingency measures" in an attainment demonstration or maintenance plan, nor was there an opportunity to discuss the kinds of circumstances which would justify the implementation of contingency measures. Consequently, it is inappropriate to draw any conclusions from either the deliberations or the report of the Stakeholders Group regarding how or when contingency measures should be implemented.

In fact, there is good reason to believe that contingency measures will not be needed. Since all of the analyses and discussions of the Stakeholders Group were focused on the nine high ozone days which occurred during the summer of 1995, and since the weather conditions on those days were unusually hot, it is unlikely that comparable or worse ozone episodes will occur in the near future. Indeed, there were no violations of the federal ozone standard in any of the years from 1989 through 1994, and there were no ozone exceedances at all during 1996, when more normal weather conditions existed.

The analyses conducted by the Stakeholders Group clearly demonstrate that there is no simple way to assign a "cause" to an ozone exceedance when it does occur. It may occur because of unusual temperature or other weather conditions, it may occur because of an increase in ozone or ozone precursors from sources upwind of Pennsylvania, or it may occur because of a temporary increase in local emissions, such as higher power generation on a hot day or an unusual amount of engine emissions from a special event. Because of this, it is impossible to predict whether greater year-round or seasonal NO_x or VOC controls within the region would have reduced or prevented a particular exceedance.

The evidence available to the Stakeholders indicated that there was very little difference between 7.8 RVP gasoline and reformulated gasoline (RFG) in terms of either the reduction of VOCs or the reduction in ozone. Since a contingency measure would presumably only be invoked when it was concluded that there was a need for significant additional reductions in precursor emissions, it does not appear that switching from low RVP gasoline to RFG would provide such additional reductions.

Appendix B

Purpose and Operating Agreements

Southwestern Pennsylvania Ozone Stakeholder Working Group Purpose and Interests

During the Working Group's first two meetings in March and April, we finalized our purpose statement (also see Operating Agreements) as well as conducted an initial scoping of our interests. This purpose statement and general summary of the interests was enlarged and posted at all subsequent meetings to help guide deliberations.

Purpose of the Working Group:

To recommend strategies for ozone attainment and maintenance based on the current health-based standards and the requirements of the Clean Air Acts.

A Good agreement will attempt to address the following criteria. It will:

- Clean the Air
- Preserve the Health of Citizens
- Be Environmentally Effective and Sound
- Minimize Negative Economic Impacts
- Be Balanced and Equitable
- Creatively Use Incentives
- Be Practical, Implementable, Flexible, Timely
- Be Based on Sound Science
- Be Acceptable to the General Public and Legislature
- Focus on Long-Term Strategies and Effectiveness

OPERATING AGREEMENTS FOR STAKEHOLDER DELIBERATIONS

PURPOSE

To recommend strategies for ozone attainment and maintenance based on the current health-based standards and the requirements of the Clean Air Acts.

CONSIDERATIONS AND CURRENT ASSUMPTIONS

The conveners (DEP, DOT) have set the following parameters for stakeholder input: a decentralized inspection and maintenance program and the NOx MOU. By agreeing to participate in this negotiation, the stakeholders do not necessarily indicate agreement with the decentralized inspection and maintenance program or the NOx MOU; nor do they waive their rights to participate in any rulemaking regarding the decentralized I/M and NOx MOU. The Working Group itself will determine agendas and topics for discussion.

ROLES

Stakeholder Representative Roles

Each member of the Ozone Stakeholder Working Group is expected to: (a) regularly attend and prepare for work sessions of the Ozone Stakeholder Working Group; (b) clearly articulate and represent the interests of his/her group; (c) listen to other points of view and try to understand the interests of others; (d) openly discuss issues with people who hold diverse views and participate in a cooperative problem solving procedure to resolve differences; (e) generate and evaluate options to address the needs expressed by the Ozone Stakeholder Working Group; (f) keep his/her constituent group(s) informed and solicit their input.

Facilitators

CDR Associates will provide facilitation services to the Ozone Stakeholder Working Group. The facilitators will design and implement discussion and decision making procedures to help the Working Group accomplish its goals. In consultation with the Process Advisory Committee, the facilitators will design work session agendas. They will conduct the meetings, provide a procedural structure, and make strategic suggestions as to how cooperative problem solving can be implemented. They will remain impartial toward the substance of the issues under discussion. Any decision that results from the facilitators' activities will be a group decision, not a decision of the facilitators. The facilitators will remain responsible to the whole group and not to one member or interest. The facilitators will enforce ground rules that are accepted by the group and that support the effective working relationship of the group.

Process Advisory Committee

The Process Advisory Committee (a subset of the stakeholders) will work with the facilitators to help with the process (develop agendas, frame issues, develop the problem solving process, etc.). Stakeholders may raise any procedural concerns with a member of the Process Advisory Committee or directly with the facilitators to improve the problem solving process. The initial members of the PAC will be selected by the facilitators based on their process expertise and appointed for three months. The Process Advisory Committee will submit all proposals to the full working group for discussion and approval. A cross section of interests from the full Working Group will be represented on the PAC.

Technical Consultants

The Ozone Stakeholder Working Group will solicit technical assistance as needed to inform the deliberations. Services might include data collection, modeling and analysis. The Commonwealth will provide the technical consultant to support the Ozone Stakeholder Working Group. In order to support the Ozone Stakeholder Working Group in an expeditious manner, the technical consultant(s) will be selected primarily from an existing PA Department of Transportation contract, although the Working Group may also solicit other technical support as appropriate and feasible.

Data Advisory Committee

The Data Advisory Committee (a subset of the stakeholders) will work with the facilitators and the stakeholders to help with technical questions, data collection, technical presentations, consultant selection and budget allocation. The Data Advisory Committee will submit all proposals to the full Working Group for discussion and approval. Membership in the DAC may evolve as deliberations progress. A cross section of interests from the full Working Group will be represented on the DAC.

DECISION MAKING

Consensus

The negotiators will use a consensus decision-making process.

Consensus is an agreement built by identifying and exploring all parties' interests and by assembling a package agreement which satisfies these interests to the greatest extent possible. A consensus is reached when all parties agree that their major interests have been taken into consideration and addressed in a satisfactory manner so that they can support the decision of the group. The process of building consensus involves the development of alternatives and the assessment of the impacts of those alternatives. A consensus agreement is one that all parties can live with.

Consensus does not necessarily mean unanimity. Some parties may strongly endorse a particular solution while others may accept it as a workable agreement. Group members can participate in the consensus without embracing each element of the

agreement with the same fervor as other members, or necessarily having each of his or her interests satisfied to the fullest extent. In a consensus agreement, the parties recognize that, given the combination of gains and trade-offs in the decision package and given the current circumstances and alternative options, the resulting agreement is the best one the involved parties can make at this time.

Key Principles of Consensus

- \$ To achieve consensus, everyone in the group must actively participate.
- \$ To participate fully and freely, all group members must have a common base of information and keep up-to-date on the progress of the group.
- \$ A norm must be created in which everyone will feel comfortable to state his or her views and to disagree.
- \$ A disagreement can illuminate unrecognized problems and serve as a catalyst for improving the decision.
- \$ The goal of the group is to discover the unmet need that has produced an objection and to find a way to meet that need in a revised agreement, rather than to suppress the objection.
- \$ Agreement on definition, principles and criteria should precede and become the underpinnings of substantive agreements.

Stakeholders will make every effort to strive for consensus. If there are issues the stakeholders cannot resolve through consensus decision making after participating in a good faith effort, the stakeholders will summarize the issues and document the remaining differences. Implementing agencies will use this summary as they advance ozone attainment in line with their mandates and air quality responsibilities.

CONSTITUENTS

An informed constituency will enhance the prospects for approval of the recommendations of the Working Group. The members of the Ozone Stakeholder Working Group will inform their constituents on an ongoing basis as to the issues under discussion and the progress being made in the cooperative problem solving sessions. Representatives will educate their constituency and advocate for the Working Group process and recommendations as they emerge. They will also represent the interests of their constituent group and bring their constituents' concerns and ideas to the negotiation. Members of the Working Group may elect to hold regular meetings with their constituent group (a formal caucus), to provide copies of work session summaries to their constituents and request comments, and/or to communicate informally with their constituents.

MEETING SUMMARY

CDR Associates will draft each meeting's Meeting Summary for the Working Group. The Working Group will review the Meeting Summary for revisions prior to its distribution. Meeting Summaries will be distributed to the Working Group and designated alternates. Draft summaries shall be considered drafts until the Working Group reaches consensus on their content and authorizes their full acceptance.

REPRESENTATION

To enhance creativity during meetings, individual representatives are not expected to restrict themselves to the prior positions held by their agencies or constituencies. Stakeholders are expected to serve as a continuous liaison so that their agency/constituency/organization's interests are represented while the stakeholders give thorough consideration to new options.

ATTENDANCE

Participating in consensus decision making **requires** consistent attendance. Official stakeholder representatives have been carefully selected to serve on the Working Group. It is essential that official stakeholder representatives make every effort to attend all meetings. An alternate may attend the meeting as a place holder and may enter into the deliberations and decision making. The alternate for each stakeholder group must be a single designated individual. The effective use of alternates requires that they attend all meetings, even when the official stakeholder representatives are present. If "special circumstances" arise regarding the attendance of a representative, the Working Group (or PAC) will discuss appropriate actions.

In order for the alternates to participate in the decision making, they must attend at least 75% of the meetings. If neither the official representative nor the alternate is present for two two-day meetings, the Working Group will discuss appropriate measures regarding the stakeholder group's participation, up to and including forfeiture of their seat.

Each stakeholder representative is responsible for staying current with any sessions he/she is unable to attend. Stakeholders are not obligated to use the time dedicated to problem solving sessions to backtrack and accommodate those who have not attended a prior meeting. If a stakeholder representative withdraws from the process, the Working Group will recommend appropriate action and forward this recommendation to the Commonwealth for review.

SUPPORT

Stakeholders representatives are encouraged to bring staff from their agency/organization and members of their constituency to support the problem solving process. Stakeholders can defer to those individuals when their expertise is required or

when requested by the Working Group. The use of support staff must not disrupt stakeholder deliberations. Only stakeholders representatives will enter into consensus decisions.

OBSERVERS

Ozone Stakeholder Working Group Meetings will be open to the public. Input by non-members may be useful to the Ozone Stakeholder Working Group. However, in order for the Working Group to achieve its mission, discussion and deliberation at Committee work sessions must be focused and manageable. Participation of non-members of the

Working Group will be at the discretion of the Working Group. Opportunities for participation by non-members include:

1. Opportunity for non-members to discuss their views with members of the Working Group during breaks.
2. Scheduled time at the end of the work sessions for questions and comments from non-members (10 or 15 minutes).

COMMUNICATING WITH THE PUBLIC

The Ozone Stakeholder Working Group will develop a public involvement component to complement their deliberations. A Public Involvement Advisory Committee (a subset of the full Working Group) will be established to provide proposals to the Working Group regarding a comprehensive, on-going, public involvement plan.

Work session summaries will be available to the public upon request. The DEP Newsletter, UPDATE, will list meeting notices and agendas. Information will also be posted on DEP's World Wide Web Public Participation Center. Requests for information will be directed to CDR Associates or DEP.

DISCUSSION GUIDELINES

The following are a number of guidelines that encourage productive negotiations. Once these guidelines have been reviewed, revised, and approved by the group, members of the Ozone Stakeholder Working Group will commit to "best efforts" at following them and will give the facilitators the authority to enforce them:

- It is absolutely crucial that everyone have a chance to be heard and to hear others. Therefore, side conversations or interruptions while someone is speaking should be avoided.
- In order to give everyone a chance to talk, participants should be sensitive about the length and pertinence of their comments and the importance of encouraging participation from all members of the group.

- In order to maximize the productive time available, people should avoid repeating points that have already been adequately made by others, except to briefly indicate concurrence.
- It is important to remain open-minded about proposals, ideas, concerns, etc., while different points of view are being presented and discussed. Rather than label particular proposals as "good" or "bad," it will be useful to be open to the underlying concerns that are expressed in a proposal.
- Disagreement is inevitable, but **must** be focused on the issues involved rather than based on perceptions of motives or relationships and personalities.
- The consensus process is a cooperative, joint problem-solving effort. Therefore, members **must** avoid competitive behavior that denigrates other participants or that is disruptive to the work of the group.
- The work sessions will begin and end promptly at the scheduled times.
- The work sessions will not be electronically recorded except by those who are developing official meeting summaries.
- Use of "killer phrases" (blatantly negative language) is discouraged
- Stakeholders will take responsibility as individuals and as a group to enforce guidelines which promote civil and respectful behaviors
- Dress for the meetings will be casual/comfortable.

COMMUNICATING WITH THE MEDIA

Work sessions of the Ozone Stakeholder Working Group will be open to the public, including the media. The consensus process is a solution-oriented, problem solving approach, not a platform for lobbying the public through the media. The deliberations of the Ozone Stakeholder Working Group should not be used as opportunities for individual members to posture in order to gain the attention of the media.

The Working Group will draft a press release after each meeting if appropriate.

In communicating with the media and the general public, a clear distinction should be made between preliminary information, concept papers, or proposals under consideration and final decisions. It is important to differentiate between discussions and decisions. Preliminary documents will be marked with "DRAFT" or "FOR DISCUSSION PURPOSES ONLY."

Each stakeholder is free to speak with the press on behalf of the agency or constituency he or she represents and must make it clear to the press that the comments should not be attributed to the whole stakeholder group. No stakeholder will speak for the whole stakeholder group without express authorization by consensus of the stakeholder group. Stakeholder representatives will use courtesy when describing the views of others, and will attempt to frame comments in general terms without attributing the point of view to an individual or stakeholder group.

EXTERNAL INITIATIVES

Stakeholder representatives will try not to initiate any new activities (e.g. law suits, legislative actions) related to ozone attainment and maintenance that are external to the process while they are participating in the negotiation. If their organization or constituency initiates such actions, they will inform the Stakeholder Working Group.

TASKS GROUPS

The Ozone Stakeholder Working Group may form task groups to perform specific functions or develop proposals on specific issues. Information and recommendations the task groups develop will be presented to the stakeholders for the Committee's consideration. The composition and scope of work for each task group will be designated by the stakeholders. The task groups may include non-members of the Consensus Committee.

INSPECTION AND MAINTENANCE WORKING GROUP

While the ozone stakeholder group deliberates, a separate but related group will be working to outline the details of a successful, decentralized emissions program. The ozone stakeholder group is responsible for policy level recommendations about the emissions program's contribution to ozone attainment. The I/M Working Group will take policy direction from the ozone stakeholders and then is responsible for recommendations about the emission program's implementation.

The purpose statement and operating agreements contained in this document are subject to review and amendment by the stakeholders. The stakeholders will be asked to reach consensus on these items at the organizational meeting.

Appendix C

List of Strategies and Descriptions

Listing of Available Control Strategies

Industry

ID Control Technology

#

Wood Furniture Coating

- 1 Thermal Oxidation
- 2 Catalytic Oxidation
- 3 Adsorption
- 4 Low-solvent Reformulated Coatings

Autobody Refinishing

- 5 Reduction of Solvent Content of Surface Preparation Products
- 6 Reduction of Solvent Content of Surface Coating Products
- 7 Improve Application Technique
- 8 Control the Use of Clean-Up Solvents

Aerosol Spray Paints

- 9 Reformulation of Paints

Surface Cleaning / Degreasing

- 10 Use of Alternative Solvents
- 11 Alternative Cleaning Processes
- 12 No-clean Technologies

Gasoline Service Stations: Underground Storage Tanks

- 13 Pressure-Vacuum (P-V) Vents

Stage II Vapor Recovery

- 14 Vapor Recovery at Gasoline Pumps

Rule Effectiveness Improvements

- 15 Increased Rule Effectiveness

Graphic Arts-Rotogravure and Flexographic Printing

- 16 Thermal Incinerators
- 17 Catalytic Incinerators
- 18 Carbon Adsorbers
- 19 Waterborne Inks

Adhesives: Industrial

- 20 Reformulation and Product Substitution

Pesticides

- 21 Reformulation

Utility Boilers

- 22 Overfire Air (OFA)
- 23 Low NOx Burner (LNB)
- 24 Low NOx Burner plus Overfire Air (LNB + OFA)
- 25 Natural Gas Reburn (NGR)

- 26 Selective Non-Catalytic Reduction (SNCR)
- 27 Selective Catalytic Reduction (SCR)
- 28 Fuel Switching
- 29 Burners Out-of-Service (BOOS)
- 30 Flue Gas Recirculation (FGR)
- Industrial Boilers**
- 31 Low Excess Air (LEA)
- 32 Burners Out-of-Service (BOOS)
- 33 Overfire Air (OFA)
- 34 Low NOx Burner (LNB)
- 35 Natural Gas Reburn (NGR)
- 36 Selective Catalytic Reduction (SCR)
- 37 Selective Non-Catalytic Reduction (SNCR)
- 38 Fuel Switching
- 39 Flue Gas Recirculation (FGR)
- 40 Water Injection (WI)
- 41 Radiant Burners (RB)
- Adipic Acid Plants**
- 42 Extended Absorption
- 43 Thermal Reduction
- Nitric Acid Manufacturing Plants**
- 44 Extended Absorption
- 45 Non-Selective Catalytic Reduction (NSCR)
- 46 Selective Catalytic Reduction (SCR)
- Cement Manufacturing (Cement Kilns)**
- 47 Low NOx Burner (LNB)
- 48 Mid-Kiln Firing
- 49 Selective Non-Catalytic Reduction (SNCR) Urea-Based
- 50 Selective Non-Catalytic Reduction (SNCR) Ammonia-Based
- 51 Selective Catalytic Reduction (SCR)
- Glass Manufacturing (Glass Furnaces)**
- 52 Retrofit Low NOx Burners
- 53 Oxy-Firing
- 54 Cullet Preheat
- 55 Electric Boost
- 56 Selective Catalytic Reduction (SCR)
- 57 Selective Non-Catalytic Reduction (SNCR)
- Gas Turbines**
- 58 Water Injection
- 59 Steam Injection
- 60 Low NOx Burner (LNB)
- 61 Selective Catalytic Reduction (SCR)

Reciprocating Internal Combustion Engines

- 62 Air/Fuel (A/F) Ratio Adjustment
- 63 Low Emission Combustion
- 64 Ignition Timing Retard
- 65 Prestratified Charge
- 66 Non-Selective Catalytic Reduction (NSCR)
- 67 Electrification
- 68 Selective Catalytic Reduction (SCR)

Process Heaters

- 69 Low Excess Air (LEA)
- 70 Low NOx Burner (LNB)
- 71 Selective Non-Catalytic Reduction (SNCR)
- 72 Radiant Burners (RB)
- 73 Flue Gas Recirculation (FGR)
- 74 Selective Catalytic Reduction (SCR)

Iron and Steel Mills

- 75 Low NOx Burner (LNB)
- 76 Low Excess Air (LEA)
- 77 Low NOx Burner plus Flue Gas Recirculation (LNB+FGR)
- 78 Selective Catalytic Reduction (SCR)
- 79 Low NOx Burner plus Selective Catalytic Reduction (LNB+SCR)
- 80 Selective Non-Catalytic Reduction (SNCR)
- 81 Low NOx Burner plus Selective Non-Catalytic Reduction (LNB+SNCR)

Residential Space and Water Heaters

- 82 Low NOx Burner (LNB)
- 83 Regulation Limiting NOx to 0.09 lb/MMBtu

Medical Waste Incinerators (MWIs)

- 84 Selective Non-Catalytic Reduction (SNCR)

Municipal Waste Combustors (MWCs)

- 85 Selective Non-Catalytic Reduction (SNCR)

Marine Vessels and Ports

- 86 Control of Emissions from Ships and Ports

Lawn and Garden

- 87 Emission Reduction Credits for Leaf Blowers

Nonroad Mobile Source Emissions

- 88 Off-Road Mobile Source Emission Reduction Credit Programs

Locomotives

- 89 EPA Two Phase Emission Standard
- 90 California Program

Aircraft and Ground Support Equipment

- 91 Control of Emissions from Aircraft and Support Equipment

Recreational Vehicles

- 92 Emission Standards for Recreational Vehicles

Open Burning

- 93 Ban on High Ozone Days

Lawn and Garden Equipment

- 94 Ban on High Ozone Days

Mobile Sources

- 95 Reformulated Diesel Fuel
- 96 Enhanced Inspection and Maintenance (I/M)
- 97 Reformulated Gasoline
- 98 Low RVP Fuels
- 99 Low Emission Vehicles Standards
- 100 Emission Reduction Credits for LEV Retrofits for Fleet Vehicles
- 101 Eliminate Excessive Car Dealership Vehicle Starts
- 102 Eliminate Excessive Curb Idling
- 103 Emissions Reduction Credit for Heavy-Duty Buses
- 104 Citizens Report Overly Emitting Cars

Transportation Control Measures (TCM)

- 105 Employer Trip Reduction (ETR)
- 106 Area-Wide Ridesharing
- 107 Transit Improvements
- 108 High Occupancy Vehicle (HOV) Lanes
- 109 Park-and-Ride Lots
- 110 Bicycle and Pedestrian Facilities
- 111 Parking Pricing
- 112 Congestion Pricing
- 113 Compressed Work Week
- 114 Telecommuting
- 115 Land Use Planning
- 116 Signal Timing
- 117 Incident Management
- 118 Emissions / Vehicle Miles Travelled (VMT) Tax
- 119 Buy-Backs of Older Cars
- 120 Single Price of Public Transit Services
- 121 Increase Gas Taxes
- 122 Free Public Transit Use During Mid-Day
- 123 Institute a Graduated Vehicle Registration Fee
- 124 Increase Speed Limit Adherence
- 125 Introduce Flashing Yellow at Night
- 126 Highway Ramp Metering
- 127 Allow Right Turns on Red
- 128 Adult/Child Day Care and Retail at Transit Stations
- 129 Regional Voucher Program

- 130 Regional Vanpool Service Insurance Pool
- 131 Advertisements to Promote Alternative Modes of Travel
- 132 Restrict High School Students from Driving to School
- 133 Employer Supplied Bicycles

ID#	Description
1	Thermal oxidation involves heating VOCs to their autoignition temperatures in the presence of sufficient oxygen to affect complete destruction.
2	Catalytic oxidation adds a catalyst to accelerate the rate of chemical reaction between VOCs and oxygen. The increased reaction rate can greatly reduce the autoignition temperature.
3	Adsorption involves the conversion of VOCs from a gas phase to a solid phase. The most common system is carbon adsorption.
4	Coatings are replaced with ones that contain non-volatile solvents.
5	The VOC content of surface preparation products is lowered.
6	The VOC content of surface coating products is lowered.
7	High transfer efficiency spray equipment is used to reduce emissions, and save money, by decreasing coating used and waste generation.
8	Solvents are cleaned up using gun-cleaning equipment that reduces solvent loss.
9	The paint is reformulated, thereby reducing the VOC content.
10	Organic solvents are replaced with non-organic solvents such as hydrochlorofluoro-carbons (HCFCs), aqueous or semi-aqueous.
11	Alternative processes such as plasma cleaning or ultraviolet, which do not contain solvents, are used.
12	Processes are modified to remove the need for degreasing.
13	Pressure vacuum vents are installed on tank vent lines to maintain pressure within the tank. This prevents excessive release of gasoline vapors from the vent pipe.
14	This measure involves reducing the amount of NO _x produced by locomotives by 17% in 2000 and 70%-80% in 2010. Possible technologies include cleaner engines (i.e., retarded timing), cleaner fuels, aftertreatment technologies (i.e., SCR) and electrification.
15	Rule effectiveness is estimated at 80 percent. This technique includes increasing the number of inspectors, stack monitoring, recordkeeping and fines.
16	Thermal incinerators burn or oxidize VOCs in the emission stream.
17	Catalytic incinerators burn or oxidize VOCs in the emission stream using a catalyst to aid in combustion.

- 18 Carbon adsorbers use activated carbon to adsorb VOCs from the vapor stream.
- 19 The VOC content of ink is lowered from a range of 50 to 85 percent down to 5 to 30 percent, with water being the replacement.
- 20 Reformulation and product substitution both involve lowering the VOC content of the adhesives.
- 21 Reformulation involves lowering the VOC content of the pesticides.
- 22 OFA allows staged combustion by supplying less than the necessary amount of air for complete combustion, with the remaining injected through overfire air ports. This lowers the formation of fuel NOx.
- 23 LNB separates combustion into a primary fuel-rich stage and a secondary fuel-lean stage. This reduces peak flame temperature, and NOx formation.
- 24 LNB + OFA is a combination of LNB and OFA.
- 25 NGR uses a second, fuel-rich combustion zone (usually natural gas) above the top row of burners to reduce NOx formed in primary combustion.
- 26 SNCR involves the reduction of NOx by ammonia or urea, at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 27 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NOx to elemental nitrogen.
- 28 Fuel Switching refers to the conversion of a coal-fired boiler to natural gas firing.
- 29 BOOS involves funnelling all of the fuel to some of the burners, producing fuel-rich conditions at these remaining burners.
- 30 FGR involves recycling up to 20 percent of the cooled flue gas back to the combustion zone, lowering peak flame temperature and oxygen concentration.
- 31 LEA involves reducing the amount of excess air, lowering oxygen availability and thereby NOx emissions.
- 32 BOOS involves funnelling all of the fuel to some of the burners, producing fuel-rich conditions at these remaining burners.
- 33 OFA allows staged combustion by supplying less than the necessary amount of air for complete combustion, with the remaining injected through overfire air ports. This lowers the formation of fuel NOx.
- 34 LNB separates combustion into a primary fuel-rich stage and a secondary fuel-lean stage. This reduces peak flame temperature, and NOx formation.
- 35 NGR uses a second, fuel-rich combustion zone (usually natural gas) above the top row of burners to reduce NOx formed in primary combustion.
- 36 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NOx to elemental nitrogen.
- 37 SNCR involves the reduction of NOx by ammonia or urea, at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 38 Fuel Switching refers to the conversion of a coal-fired boiler to natural gas firing.

- 39 FGR involves recycling up to 20 percent of the cooled flue gas back to the combustion zone, lowering peak flame temperature and oxygen concentration.
- 40 Water injection into the combustion zone lowers the peak flame temperature, limiting the formation of thermal NOx emissions.
- 41 RB pass premixed air and gaseous fuel through porous ceramic fiber tips which glow, with no flame, at 1800 degrees Fahrenheit. Little thermal NOx is formed and low excess air is used.
- 42 Extended absorption increases absorption efficiency of NOx by extending the height of the absorption tower.
- 43 Thermal reduction involves mixing NOx with excess fuel in a reducing environment, and then heating the stream above its ignition temperature.
- 44 Extended absorption increases absorption efficiency of NOx by extending the height of the absorption tower.
- 45 NSCR uses three-way catalysts to consume free oxygen and promote the reduction of NOx to elemental nitrogen and water. CO and HC are simultaneously oxidized to CO₂ and H₂O.
- 46 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NOx to elemental nitrogen.
- 47 LNB separates combustion into a primary fuel-rich stage and a secondary fuel-lean stage. This reduces peak flame temperature, and NOx formation.
- 48 Mid-kiln firing involves a secondary combustion of the fuel.
- 49 SNCR involves the reduction of NOx by urea, at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 50 SNCR involves the reduction of NOx by ammonia at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 51 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NOx to elemental nitrogen.
- 52 This includes combustion staging (fuel-rich and air-rich combustion zones in a single burner) and limited excess air burners (a turbulent mixing of fuel and air).
- 53 Oxy-firing, also known as oxygen enrichment, refers to the substitution of oxygen for nitrogen in the combustion air. (oxygen is above 90%)
- 54 This involves preheating the cullet (broken glass), thereby requiring less fuel and reducing NOx emissions.
- 55 This measure involves reducing the amount of NOx produced by locomotives by 17% in 2000 and 70%-80% in 2010. Possible technologies include cleaner engines (i.e., retarded timing), cleaner fuels, aftertreatment technologies (i.e., SCR) and electrification.
- 56 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NOx to elemental nitrogen.
- 57 SNCR involves the reduction of NOx by ammonia or urea, at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 58 Water injection in a gas turbine lowers the peak flame temperatures, limiting the formation of thermal NOx emissions.
- 59 Steam injection in a gas turbine lowers the peak flame temperatures, limiting the formation of thermal NOx emissions.

- 60 LNB separates combustion into a primary fuel-rich stage and a secondary fuel-lean stage. This reduces peak flame temperature, and NO_x formation.
- 61 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NO_x to elemental nitrogen.
- 62 A/F Ratio Adjustment involves lowering or raising the air-to-fuel ratio, thereby lowering the peak flame temperature (in either case), and thereby lowering NO_x emissions.
- 63 Low Emission Combustion is the combustion of a very fuel-lean mixture. NO_x emissions, as well as CO and HC, are severely reduced.
- 64 Ignition Timing Retard lowers NO_x emissions by moving the ignition event to later in the power cycle, when the piston has begun to move downward, thus lowering the peak temperature.
- 65 Prestratified Charge involves injecting fuel and air in 'slugs' which become distinct fuel and air layers. This creates a fuel-rich mixture around the spark plug which results in a lower combustion temperature, and less thermal NO_x.
- 66 NSCR uses the three-way catalysts to consume free oxygen and promote the reduction of NO_x to elemental nitrogen and water. CO and HC are simultaneously oxidized to CO₂ and H₂O.
- 67 Electrification refers to replacing an internal combustion engine with one powered by electricity, thereby eliminating all emissions at that source.
- 68 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NO_x to elemental nitrogen.
- 69 LEA involves reducing the amount of excess air, lowering oxygen availability and thereby NO_x emissions.
- 70 LNB separates combustion into a primary fuel-rich stage and a secondary fuel-lean stage. This reduces peak flame temperature, and NO_x formation.
- 71 SNCR involves the reduction of NO_x by ammonia or urea, at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 72 RB pass premixed air and gaseous fuel through porous ceramic fiber tips which glow, with no flame, at 1800 degrees Fahrenheit. Little thermal NO_x is formed and low excess air is used.
- 73 FGR involves recycling 15 to 30 percent of the cooled flue gas back to the combustion zone, lowering peak flame temperature and oxygen concentration.
- 74 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NO_x to elemental nitrogen.
- 75 LNB separates combustion into a primary fuel-rich stage and a secondary fuel-lean stage. This reduces peak flame temperature, and NO_x formation.
- 76 LEA involves reducing the amount of excess air, lowering oxygen availability and thereby NO_x emissions.
- 77 LNB + FGR is a combination of LNB and FGR.
- 78 SCR uses a catalyst and ammonia in the presence of oxygen to reduce NO_x to elemental nitrogen.
- 79 LNB + SCR is a combination of LNB and SCR.

- 80 SNCR involves the reduction of NO_x by ammonia or urea, at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 81 LNB + SNCR is a combination of LNB and SCR.
- 82 LNB separates combustion into a primary fuel-rich stage and a secondary fuel-lean stage. This reduces peak flame temperature, and NO_x formation.
- 83 This measure involves limiting the amount of NO_x which can be produced by new heaters, but not specifying a methodology. (incentives may be given to speed turnover of old heaters)
- 84 SNCR involves the reduction of NO_x by ammonia or urea, at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 85 SNCR involves the reduction of NO_x by ammonia or urea, at 1,600 to 2,000 degrees Fahrenheit, without a catalyst.
- 86 Included in this measure is a 15% reduced throttle setting (estimated at producing a 45% reduction in NO_x/mile), engine modifications, moving the shipping lanes further out and using clean technologies for onshore activities.
- 87 Emission credits will be given to those cities or entities which prohibit the use of leaf blowers or replace gasoline blowers with non-polluting alternatives.
- 88 Emission credits will be given to facilities for accelerated retirement and replacement of old off-road equipment and vehicles (i.e., farm, construction, utility and industrial equipment, aircraft, trains, etc.) with zero- or low- emitting units.
- 89 This measure involves limiting the amount of NO_x which can be produced by new locomotives (7.0 g/bhp-hr in 2000, 6.0 g/bhp-hr in 2005), and those which are rebuilt (8.0 g/bhp-hr). Technologies include clean fuels and aftertreatment technologies.
- 90 This measure involves reducing the amount of NO_x produced by locomotives by 17% in 2000 and 70%-80% in 2010. Possible technologies include cleaner engines (i.e., retarded timing), cleaner fuels, aftertreatment technologies (i.e., SCR) and electrification.
- 91 Proposed CA measure conversion of Ground Support to alternative fuels, aircraft fleet modernization, airport airside congestion improvements (i.e., idling and queuing), and, where feasible, retrofitting aircraft engines.
- 92 This measure entails setting up standards for various recreational vehicles including ATVs, Golf Carts and Go-Karts. These standards will regulate VOC and CO.
- 93 This measure involves banning the burning of waste on days that are expected to exceed the ozone standard.
- 94 This measure involves restricting the use of lawn and garden equipment on days that are expected to exceed the ozone standard.
- 95 Diesel fuel is reformulated to lower sulfur (down to 500 ppm) and aromatics (lowered by 10%, 20% for small refineries). This results in lowered NO_x emissions.
- 96 Enhanced I/M programs test vehicle emissions while the vehicle is idling and accelerating.

- 97 Gasoline is reformulated to reduce both the evaporative and exhaust portion of VOC emissions, as well as the NOx from combustion exhaust.
- 98 Gasoline is reformulated to have lower fuel volatility in order to reduce evaporative emissions.
- 99 These regulations establish more stringent emission standards for light duty vehicles and trucks.
- 100 Businesses would retrofit the cars in their fleet with LEV technology. This could be either in exchange for emission credits or mandatory.
- 101 The cold start is the highest polluting operating mode. Many car dealers start their vehicles daily to avoid battery failure and ensure smooth start-ups. This would limit start-ups to bi-weekly, with exceptions for test drives, vehicle maintenance, etc.
- 102 Extended idling can result in VOC and CO emissions beyond those associated with one engine start. This measure would install a three minute time limit on idling.
- 103 Businesses would retrofit the diesel buses in their fleet with low-emission or zero emission technologies. This could be either in exchange for emission credits or mandatory.
- 104 Citizens are urged to call a toll free number to report vehicles which are visibly polluting. The offending vehicles are sent a notice, along with information regarding emission laws and repair information. They are not required to make the repairs.
- 105 An area ETR program is a government regulation requiring employers, usually above a certain size, to develop and carry out plans to encourage workers to switch from single occupancy vehicles. (i.e., carpools, bike racks or showers, subsidies for transit)
- 106 An area-wide ridesharing program provides carpool matching and informational services. It may also involve promotional activities aimed at encouraging carpooling. It may be operated directly by local government or by a non-profit contractor.
- 107 Transit improvements are carried out by transit agencies that are agencies of local governments, often with federal financial support. Transit includes buses, light rail, heavy rail, commuter rail, etc.
- 108 A HOV lane is a highway lane reserved for the use of buses and carpools above a certain size. (i.e., carpools of at least three members) They almost always require construction of new capacity, and are usually put in place by a state highway department.
- 109 A park-and-ride lot is a parking lot located for convenient access to a transit station or HOV lane. It is offered to induce Single Occupancy Vehicle (SOV) commuters to switch to transit or to carpools.
- 110 This refers to the provision of paths or other facilities which pedestrians and cyclists can use without interference from auto traffic. It may also include the provision of bicycle storage facilities and showers at or near work places.

- 111 One version would be to charge employees the market price for their parking space. A second version would be to charge employees for their space, but to give them this value in either cash or a transportation voucher which can only be used for commuting.
- 112 At hours of peak demand charges are assessed which are high enough to reduce highway use, and thus congestion. The charge can be in the form of tolls on a highway, a cordon charge for crossing a specific line or pricing differentials on a bridge.
- 113 In this plan, the hours worked per day are extended, and the number of days worked reduced. The most common versions are 4/40 and 9/80. (i.e., four days at ten hours/day, etc.) This eliminates work trips, but may be negated by non-work trips.
- 114 Telecommuting eliminates work trips by allowing employees to work at home some of the time. Under one version, employees would work at centers near their homes where facilities would be available.
- 115 This entails designing new developments so that communities generate less travel, especially by auto. In these communities, jobs, housing, service and retail activities would be located close together, and more trips could be taken on foot or by bicycle.
- 116 Traffic signal timing can be improved to significantly enhance the flow of vehicles. The impact on emissions comes from auto travel in less congested areas, not from less auto travel.
- 117 Incident management programs involve mitigation and speedy removal of traffic blockages caused by accidents and breakdowns. The impact on emissions comes from auto travel in less congested areas, not from less auto travel.
- 118 An emissions based fee would replace or supplement existing registration fees. It could be based either on emissions per mile, or emissions per mile combined with total miles driven. The emissions could be based on testing or on the cars make and model.
- 119 This involves paying owners of old cars to scrap their vehicles. Since, on average, older cars are far worse polluters than newer ones, removing them will reduce total emissions. The benefit will be based on the local fleet mix.
- 120 All transit users would be charged a flat fare (i.e., \$1.00) for a one-way trip, regardless of how the trip was made or how many transfers were required. This policy would be in effect all day long, all week long.
- 121 Increase state/regional/local gas taxes (i.e., \$0.25/year for 10 years) with rebates to transit operators and trucking services. Proceeds go to fund regional transit operations.
- 122 Transit services would be free during the middle of the day. (i.e., 10AM-3PM weekdays) This would increase transit use, but decrease transit revenue.
- 123 Instituting a graduated vehicle registration fee (i.e., 1st auto owned at \$500, 2nd auto owned at \$500+\$250, 3rd auto owned at \$500+\$400, etc.) would help reduce the number of multiple-vehicle households in the region.

- 124 Studies indicate that the 85th percentile speed is higher than 55 mph (on 55 mph freeways) and that emissions increase over 48 mph. The 85th percentile speed on the freeways would be reduced to 55 mph, through increased enforcement and education.
- 125 Introduce a flashing yellow light in the predominant direction and flashing red in the minor direction at night (i.e., 12 midnight to 5AM) , where safety and geometries permit. This would reduce idling emissions at no cost, and with an energy savings.
- 126 This measure would install signal controls at selected freeway ramp entrances. These signals would control the flow of vehicles onto the freeway system. Carpools, vanpools and transit would get preferential treatment.
- 127 Prohibiting right turns causes vehicles to idle at intersections. Removing these restrictions will result in a savings in idling emissions.
- 128 This measure would help to provide day care and shops at transit stations. This would make it attractive to use transit by eliminating the need for people to use cars for day-care and shopping.
- 129 This measure is a subsidy for transit, carpool, vanpool and other modes of travel. The measure impacts only work and work-related trips. Employees would pay a parking fee and get a monthly voucher for the same amount.
- 130 Establishing a regional insurance pool would reduce both the difficulty in obtaining insurance and the cost of insurance coverage.
- 131 This would educate the public about the health benefits of reducing air pollution, and the implications of not meeting federal requirements. It could also request that citizens curtail their driving when a forecast of a potential violation is issued.
- 132 The measure would restrict high school students from driving to school when the school system provides bus service.
- 133 This measure would provide use of a bicycle for employees during the mid-day. (i.e., one bicycle per 50 employees)
This would give employees an alternative mode of travel for mid-day business or personal use.